

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**ANIMAL MORTALITY FACILITY**

(No.)

CODE 316

**DEFINITION**

An on-farm facility for the treatment or disposal of livestock and poultry carcasses.

mortality; however, it does not apply to catastrophic mortality resulting from disease.

**PURPOSE**

This practice may be applied as part of a conservation management system to support one or more of the following purposes:

- Decrease non-point source pollution of surface and groundwater resources
- Reduce the impact of odors that result from improperly handled animal mortality
- Decrease the likelihood of the spread of disease or other pathogens that result from the interaction of animal mortality and predators
- To provide contingencies for normal and catastrophic mortality events.

***FEDERAL, STATE AND LOCAL LAWS <sup>1/</sup>***

***Design and construction activities shall comply with all federal, state, and local laws, rules, and regulations governing pollution abatement, structures, health and safety or activities in or along streams, pollution abatement, health, and safety. The owner or operator shall be responsible for securing all required permits or approvals and for performing all planned work in accordance with such laws and regulations. NRCS employees are not to assume responsibility for procuring these permits, rights, or approvals, or for enforcing laws and regulations. NRCS may provide the landowner or operator with technical information needed to obtain the required rights or approvals to construct, operate, and maintain the practice.***

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies where animal carcass treatment or disposal must be considered as a component of a waste management system for livestock or poultry operations. It applies where on-farm carcass treatment and disposal are permitted by federal, State, and local laws, rules, and regulations. It also applies where a waste management system plan as described in the National Engineering Handbook (NEH), Part 651, Agricultural Waste Management Field Handbook (AWMFH) has been developed that accounts for the end use of the product from the mortality facility. This practice includes disposal of both normal and catastrophic animal

***Permits may be required from the following agencies:***

- 1. West Virginia Department of Health (WVDH)***
- 2. West Virginia Department of Agriculture (WVDA)***
- 3. County or local Department of Health***

**NRCS, NHCP**

**March 2003**

**NRCS, WV**

**August, 2005**

Conservation practice standards are reviewed periodically, and updated as needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

***Note: Bold italics information added or changes made in the National Conservation Standard by***



**4. Refer to the Code of State Regulations (WV) for wellhead protection Table 64-46A.**

**CRITERIA**

**General Criteria Applicable to All Purposes**

The facility shall be designed to handle normal mortality and/or catastrophic mortality.

The planning and design of animal mortality facilities or processes must conform to all federal, State and local laws, rules and regulations. This includes provisions for closing and/or removing the facility where required.

All structural components integral to animal mortality management shall meet the structural loads and design criteria as described in NRCS conservation practice standard 313, Waste Storage Facility, unless otherwise designated.

Where an animal mortality facility can be damaged by surface runoff **(not originating from a 100 yr. floodplain)** the **25 yr.-24 hr. storm** runoff shall be diverted away from the facility. **The associated diversion shall be designed according to CPS Diversion (362).**

**Location.** The location shall minimize the impact of the facility on odor and other air quality issues affecting neighboring residences, as well as minimizing the impact of the facility on surface and ground water resources. In addition, the facility, where practical, shall be generally down gradient from a spring or well.

**For preliminary design considerations Refer to Table 8 "Building Site Development; Shallow Excavations and Small Commercial Buildings" of the local USDA NRCS county soil survey for a general description of the foundation material's restrictive soil features.**

**Provide site-specific soils investigation and/or geological investigation shall be provided for design.**

The animal mortality facility shall be located outside the 100 year floodplain; however if site restrictions require location within a floodplain, they shall be protected from inundation or damage.

The location of the animal mortality facility shall be consistent with the overall site plan for the livestock or poultry operation.

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**Locate facility so prevailing winds and landscape elements such as building arrangement, landforms and vegetation minimize odors and protect the visual resource.**

**Direct surface runoff from the facility. Direct contaminated runoff away from the facility to an appropriate waste storage or treatment facility.**

**Avoid locating composting facilities on slopes greater than 5 percent, in drainage ways or low areas where runoff may be concentrated.**

**Maintain the minimum distance as shown in the table from well, sinks or drainage areas.**

**Table 1-Setback Distance (ft.)Criteria for Locating a Animal Mortality Facility**

	<b>Down gradient (ft)</b>	<b>Up gradient (ft)</b>	<b>Adjacent (ft)</b>
<b>Private Well</b>	<b>200</b>	<b>200</b>	<b>200</b>
<b>Public Well</b>	<b>300</b>	<b>300</b>	<b>300</b>
<b>Sink or water course</b>	<b>200</b>	<b>200</b>	<b>300</b>
<b>Adjacent Residence</b>	<b>Minimum 300 ft. setback, recommend 900'. Consider prevailing wind direction.</b>		

**Seepage Control.** Where seepage from mortality facilities will create a potential water quality problem and it is deemed necessary to reduce seepage, use AWMFH, Appendix 10D, for clay liner design criteria, or other acceptable liner technology.

**Criteria Applicable to All Purposes – Normal Mortality**

The facility shall be located as close to the source of mortality as practical, considering bio-

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security issues and the need to keep the facility out of sight of the general public.

#### **Composters.**

**General.** Design of facilities for composting animal mortality shall conform to conservation practice standard 317, Composting Facility, or the guidance in National Engineering Handbook Part 637, Chapter 2 – Composting (NEH 637.0211, Dead Animal Composting).

**Compost Mix.** *Develop a compost mix that encourages aerobic microbial decomposition and avoids nuisance odors.*

*The following references shall be used to aid in designing the composting mix and associated elements. NEH, Part 637, Chapter 2, Composting and Agricultural Waste Management Field Handbook (AWMFH).*

**Carbon-Nitrogen Ratio.** *The initial compost mix shall result in a Carbon to Nitrogen ratio between 25:1 and 40:1. Compost with a greater carbon to nitrogen ratio can be used if nitrogen immobilization is not a concern.*

**Carbon Source.** *A dependable source of carbonaceous material with a high carbon to nitrogen ratio (C: N) shall be stored and available to mix with nitrogen rich waste materials.*

**Bulking Materials.** *Add bulking materials to the mix as necessary to enhance aeration.*

*The bulking material may be the carbonaceous material used in the mix or a non-biodegradable material that is salvaged at the end of the compost period. If a non-biodegradable material is used, provision shall be made for its salvage.*

**Moisture Level.** *Provisions should be made for maintaining adequate moisture in the compost mix throughout the compost period within the range of 40 to 65 percent (wet basis). A good method of determining the moisture content is to compare the composted material to the consistency of wet sponge that has been hand wrung. Avoid adding too little or too much moisture, either will have an adverse impact on the composting process.*

*In high precipitation climatic regions, care shall be taken to prevent excess moisture from accumulating in the compost. Facility*

*covers may be required to provide for a suitable product*

**Temperature of Compost Mix.** *Manage the compost to attain and then maintain the internal temperature for the duration required to meet management goals.*

*When the management goal is to reduce pathogens, the compost shall attain a temperature greater than 130°F for at least 5 days as an average throughout the compost mass. Take multiply readings at various depths to determine average temperature.*

*Achieve the temperature and time criterion during the primary or secondary composting stages or as the cumulative time when greater than 130°F is attained or exceeded in both stages. Long stem thermometers shall be purchased and stay on site to check and document the composting temperatures. Probe a minimum of three locations in each compost area and to different compost depths to determine if the compost is uniform.*

**Turning/Aeration.** *The frequency of turning/aeration shall be appropriate for the composting method used. To attain the desired amount of moisture removal and temperature control while maintaining aerobic degradation a minimum of one complete turn per compost cycle is required. Equipment such as small front-end loaders, aerators, etc. shall be available for initial layering, mixing, turning and hauling composted material and carbonaceous. Material shall be turned so that the proper aeration occurs. The top cooler material is placed midway to lower of the new/secondary pile for additional composting.*

**Facility Type.** *Selection of the composting facility/method shall be based on the availability of raw material, the desired quality of final compost, equipment, labor, time, and land available.*

*Facility structural elements such as permanent bins, concrete slabs, and roofs shall meet the requirements of Conservation Practice Standard 313, Waste Storage Facility.*

**Facility Size.** *Size the compost facility to accommodate the amount of raw material planned for active composting plus space required for curing.*

**Dimensions selected for elements of the compost facility shall accommodate equipment used for loading, unloading, and aeration.**

**Sizing of facilities for composting dead animals shall be based on normal mortality loss records for the operation. Alternatively, locally established mortality rates for the type of operation shall be used if records are not available.**

**Compost Period.** *Continue the composting process long enough for the compost mix to reach the stability level where it can be safely stored without undesirable odors. It shall also possess the desired characteristics for its use, such as lack of noxious odor, desired moisture content, level of decomposition of original components and texture. The compost period shall involve primary and secondary composting as required to achieve these characteristics.*

**Test the finished compost as appropriate to assure that the required stabilization has been reached.**

#### **Freezers.**

**General.** Freezer units shall be of the chest type with a construction compatible with the mechanism to be used to empty the freezer. Provisions for protecting the freezer unit from precipitation and direct sun shall be made as deemed appropriate.

The freezer unit design, construction, power source, and unit installation shall be in accordance with manufacturer's recommendations. Freezers shall be constructed of durable material with a life expectancy compatible with other aspects of the waste management system. The freezer container shall be leakproof to minimize odor and leachate pollution.

Where needed, the freezer will be placed on a pad of suitable strength to withstand loads imposed with vehicular traffic consistent with

equipment used to load or remove the box or tray.

**Temperature.** The freezers shall be self-contained units designed to freeze animal carcasses before decomposition occurs. For best results, the temperature of the carcasses shall be maintained between 22° and 26° F.

**Capacity.** Freezer units shall be sized to accommodate the normal maximum volume of mortality to be expected in the interval between emptying. Volume calculations shall include the expected mortality rate of the animal, the period of time between emptying where mortality is given on a per day basis, the average weight of the animal between emptying, and a conversion factor for weight to volume. For broiler operations use a weight to volume conversion of a minimum of 45 pounds per cubic foot. Capacity calculations shall be supported by a removal schedule supplied by an integrator or approved vendor.

**Power Source.** An alternative source of power, where available, shall be used to maintain the integrity of the freezing process during power outages. Where an alternative power source will not be available, the operation and maintenance plan shall contain contingencies for disposal of the poultry mortality.

#### **Incinerators.**

**General.** Incinerators shall be dual burning Type 4 (human and animal remains) approved for use within the state.

**Location.** The incinerator shall be located a minimum of 20 feet from any structure. The incinerator shall be placed on a concrete pad with the fuel source as distant as practical. If the incinerator is covered with a roof, at least six inches are required between the incinerator chimney and any combustible roof parts.

**Capacity.** Minimum incinerator capacity shall be based on the average daily weight of animal mortality and the length of time the incinerator will be operated each day.

The following table lists factors that could be used in determining minimum daily weight of animal mortality when sizing incinerators:

TYPE OF ANIMAL	DAILY LOSS FACTOR
	(pounds/day/animal)
Chicken:	
Broilers	0.0024
Laying hens	0.0014
Breeding hens	0.0019
Breeder, male	0.0082
Turkeys:	
Hen	0.0081
Tom, light	0.0193
Tom, feather production	0.0286
Swine: Suckling pigs (per sow)	0.0400

Poultry operations often experience higher rates of mortality as the birds reach maturity. The capacity of incinerators should be sized to insure the mortality of the large birds can be handled within the time frame allowed for incineration.

#### **Criteria Applicable to All Purposes – Catastrophic Mortality**

**General.** Processes addressed by this standard shall be limited to burial and composting. Catastrophic mortality shall be collected as soon as practical and moved away from the production facility.

**Location.** The facility shall be located as far away from neighboring dwellings and the poultry or livestock operation as site conditions permit. Locate on sites with restricted percolation and a minimum of two feet between the bottom of the facility and the seasonal high water table unless special design features are incorporated that address seepage rates and non-encroachment of contaminants into the water table. Use AWMFH Appendix 10D for selection of sites where seepage will be restricted with normal construction techniques.

#### **Burial Pit**

**General.** Catastrophic mortality resulting from natural conditions such as temperature extremes shall be buried on-site or as otherwise directed by state and local regulatory agencies.

***Burial site should not be located on highly permeable soils or over fractured or cavernous bedrock within two feet of the bottom of the pit or in soils with a seasonal high water table less than two feet from the bottom of the pit. Document soils, location, surface and/or sub-surface characteristics of the burial site.*** Burial of catastrophic mortality shall be timed to minimize the effects of mortality expansion during early stages of the decay process. Where possible and permitted by state law, mortality shall remain lightly covered (***minimum of 2 feet of top soil or cover with a weighted-geotextile fabric that will allow ventilation but hinder vermin and birds from removing carcasses. The cover shall remain*** until bloating has occurred, or methods employed to reduce or eliminate bloating. Topsoil shall be retained to re-grade the disposal site after the ground has settled as the decay process is completed. Stockpiled soil shall be no closer than 20 feet from the edge of the burial pit.

**Size and Capacity.** Pits shall be sized to accommodate catastrophic mortality using appropriate weight to volume conversions. Capacity shall be in accordance with criteria acceptable to state and local regulatory agencies. The burial pit shall be a minimum of 4 feet wide with length necessary to accommodate mortality. Depth shall accommodate a minimum of 2 feet of cover over the mortality. Pit bottoms shall be relatively level. Lengths may be limited by soil suitability and slope. If more than one pit is required, they shall be separated by a minimum of three feet of undisturbed or compacted soil. The burial site shall be of sufficient volume to contain the mortality with a minimum of two feet of soil cover. The burial site shall be finish graded to slightly above natural ground elevation to accommodate settling.

**Structural Loading and Design.** Vehicular traffic shall not be allowed within four feet of the pit edge.

For pits that are four to five feet deep, a step or bench 18 inches wide and one foot deep will be dug around the perimeter of the main pit so the remaining vertical wall will not exceed four feet. For pits greater than five feet deep, the earthen wall shall be sloped back at 1 1/2 horizontal and 1 vertical or flatter.

## Composting

**General.** Catastrophic mortality composting shall be in either passive piles or windrows as described in National Engineering Handbook Part 637, Chapter 2 – Composting (NEH 637.0210 and NEH 637.0211).

Composting mortality shall be protected from precipitation as necessary, or provisions made for collecting contaminated runoff. Static piles or windrows covered with sawdust, finished compost, or other benign material will not need further protection.

## CONSIDERATIONS

Major considerations in planning animal mortality management are:

- Available equipment at the operation (width of front-end loader, height of bucket, etc.)
- The management capabilities of the operator,
- The degree of pollution control required by state and local agencies,
- The economics of the available alternatives, and
- Effect on neighbors.

Consideration should be given to prevailing wind direction and neighbors when siting animal mortality disposal facilities. A minimum of 900 feet should separate the facility from the nearest neighboring residence and no closer than 300' and the facility should be 200 feet from a well, spring, or water course. Refer to Table 1 one for WV considerations.

Runoff from the livestock or poultry facility, or from outside areas should be diverted away from the animal mortality disposal facility.

Composting of poultry mortality will be hindered if the bird carcasses are allowed to freeze. Birds should be kept in a dry, non-freezing environment until added to the compost mix.

Facility sizes for composting large animal carcasses should reflect the longer compost periods required.

An alternative to prevent bloating of catastrophic mortality die off could include opening animal thoracic and abdominal cavities and viscera prior to placing required cover.

Incineration produces varying quantities of ash that will need to be properly handled.

Vegetative screens and topography can be used to shield the animal disposal facility from public view, and to minimize visual impact.

State requirements for record keeping vary. Items such as burial site location, type and quantity of mortality, burial date, and other pertinent details should be noted at the time of burial.

Operators should maintain a list of current phone numbers for state and local officials to aid in notification if disease-related catastrophic mortality occurs.

Safety devices such as fencing, warning signs, and freezer locks may be necessary at certain sites.

Bio-security concerns should be addressed in all aspects of planning, installation, and operation and maintenance of an Animal Mortality Facility.

Ground disturbing activities such as excavation and site preparation for disposal facilities have the potential to affect significant cultural resources.

## PLANS AND SPECIFICATIONS

Plans and specifications for animal mortality facilities shall be in keeping with this standard and shall describe the requirements for applying this practice to achieve its intended purpose.

***Required permits shall be obtained prior to initiating any work.***

## REFERENCES

Agricultural Waste Management Field Handbook (AWMFH)

National Engineering Handbook, Part 637, Chapter 2, Composting

NRCS GM 420 Part 401 – Cultural Resources

NRCS National Handbook of Conservation Practices

ASTM C1227-00b Standard Specification for Pre-cast Septic Tanks

***Resources available are WV-Animal Mortality Facility 316 Worksheet, WV-ENG-***

**71 through WV-ENG-74, WV-ENG-76, WV-ENG-77, WV-ENG-79a, WV-ENG-79b, and WV "700 series" specifications or the specifications attached to this standard.**

- ***Northeast Regional Agricultural Engineering Service, Cooperative Extension "On-Farm Composting"***
- ***NRCS Field Office Technical Guide (eFOTG), Section IV, Conservation Practice Standard - Composting Facility, 317.***
- ***NRCS National Engineering Manual (NEM).***
- ***NRCS National Environmental Compliance Handbook***
- ***210-VI-EFH Amend. 45, WV5 Preparation of Engineering Plans***
- ***210-V-NEM Part 505 – Non-NRCS Engineering Services***
- ***WV Engineering Field Handbook***
- ***Composting Handbook", NRAES-54.***

**OPER NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**ANIMAL MORTALITY FACILITY**

**(No.) Code 316**

**OPERATION AND MAINTENANCE**

An operation and maintenance plan applicable to this practice that includes, but is not limited to, the items listed below will be developed with the operator, and will become a part of the overall waste management system plan. The requirements in the individual operation and maintenance plan shall be consistent with the practice purposes, intended life, and design criteria. Safety considerations shall be prominently displayed in the plan.

***Normal Mortality***

Animal mortality facilities will normally be operated or used on a daily basis. At each operation or use, the facility shall be inspected to note any maintenance needs or indicators of operation problems.

***Catastrophic Mortality***

Possible locations for catastrophic animal mortality facilities shall be located during the planning process to be operated as needed.

Burial of catastrophic mortality shall be timed to minimize the effects of mortality expansion during early stages of the decay process. Where possible and permitted by state law, mortality shall remain uncovered or lightly covered until bloating has occurred. Some topsoil shall be retained to re-grade the disposal site after the ground has settled as the decay process is largely completed.

Where composting is used for catastrophic mortality disposal, the operation and maintenance plan shall identify the most likely compost medium, possible compost recipes, operational information, and equipment that will need to be readily available.